SCOPING REPORT

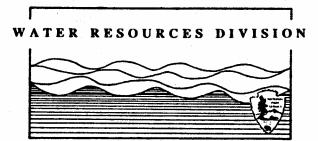
GREAT BASIN NATIONAL PARK WATER RESOURCES MANAGEMENT PLAN

Prepared by

National Park Service

in cooperation with Great Basin National Park

Technical Report NPS/NRWRD/NRTR-91/05



National Park Service • Department of Interior Fort Collins • Denver • Washington

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National Park Service



The National Park Service Water Resources Division is responsible for providing water resources management policy and guidelines, planning, technical assistance, applied research, training and operational support to units of the National Park Service. Program areas include water rights, water resources planning, regulatory guidance and review, hydrology, water quality, watershed management, watershed studies and aquatic ecology.

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INTRODUCTION

Great Basin National Park was established by the United States Congress in 1986 in order to "preserve for the benefit and inspiration of the people, a representative segment of the Great Basin of the Western United States possessing outstanding resources and significant geologic and scenic values." (P.L. 99-565). The Park is located in east-central Nevada, and incorporates the former Lehman Caves National Monument and the Wheeler Peak Scenic Area of the Humboldt National Forest.

The Great Basin physiographic region is an extensive area (196,000 mi¹) comprised of high desert basins interspersed with a series of nearly 200 isolated long, narrow, north-south oriented mountain ranges. Great Basin National Park contains approximately 77,000 acres of largely mountainous terrain in the South Snake Range and rises from 6,200 feet at the valley floor to 13,063 feet at the summit of Wheeler Peak. Soil types, climate, and vegetation are vertically-zoned, and the park contains a number of diverse ecosystems ranging from the high desert to arctic alpine areas above timberline. While annual rainfall in the basin valleys of the Great Basin physiographic region is generally less than 10 inches, mountain ranges such as the South Snake Range may receive 2 to 3 times that amount.

The water resources of Great Basin National Park are diverse and include 13 perennial streams, 5 alpine lakes, numerous springs, and extensive riparian areas and wet meadows. Ten streams flow eastward into the Snake Valley and 3 flow westward into Spring Valley. The two largest streams in Great Basin National Park, Baker Creek and Lehman Creek, arise in the Wheeler Peak area. Most of the development within the park is presently contained within their drainages. Upon exiting the park, most of the streams gradually percolate into the alluvium and/or evaporate upon reaching the adjacent valleys.

WATER RESOURCES MANAGEMENT PLAN

Whether in support of natural systems or providing for visitor use, water is often a significant resource in units of the National Park System. Consistent with its fundamental purpose, the National Park Service (NPS) seeks to perpetuate surface and ground waters as integral components of park aquatic and terrestrial ecosystems, by carefully managing the consumptive use of water and striving to maintain the high quality of surface and ground waters in accordance with all applicable federal, state, and local laws and regulations. In addition, the NPS assures compliance with all floodplain management and wetland protection requirements and obtains and uses water for the preservation, management, development, and use of the National Park System in accordance with legal authority and with due consideration of the needs of other water users.

An essential step in addressing a park's water resources issues is planning. In parks where water resources are sufficiently important, complex, or controversial, a Water Resources Management Plan is often prepared. The Water Resources Management Plan structures and uses information about the park's hydrologic resources to assist management in evaluating the range of alternatives concerning water resources issues.

There are three major sections in a Water Resources Management Plan. First, the plan provides the necessary background with respect to the park and water resources issues, concerns, and needs which have led to the preparation of a Water Resources Management Plan. In particular, this section provides information on laws, regulations, and policies applicable to the park, and land status and uses adjacent to the park. This section also sets forth the objectives concerning use and management of water in the park and lists the specific water resources issues that have been identified for evaluation in the plan. The second major section of the plan provides sufficient information to characterize the hydrologic setting of the park and to describe the current condition and status of park water resources. Depending on the hydrologic resources of the park and the water resource issues to be addressed, the description of the hydrologic environment section should summarize published information, and perform, where necessary, an analysis of available unpublished data, including information relating to the physiography, climate, and geology; surface water resources; groundwater resources; aquatic and riparian resources and habitats; water uses within the park; and water rights. The final section of the plan presents the action program of the planning effort. This section includes specific project statements which describe day-to-day operational activities and special projects necessary to address the water resources issues facing the park. These activities and projects may consist of management, monitoring, interpretation, law enforcement specifically directed toward water resources protection, program administration, research, management studies, and mitigation/treatment action. Guidance for the development of a Water Resources Management Plan may be found in "Instructions for the Preparation of Water Resources Management Plans" (National Park Service, 1989).

WATER RESOURCES MANAGEMENT PLANNING ISSUES AT GREAT BASIN NATIONAL PARK

An initial scoping session was held at Great Basin National Park on June 6-7, 1989, in order to identify water resources issues and concerns of park management. Specific water resources issues to be addressed in the Water Resources Management Plan include:

1) Water Rights

The enabling legislation establishing Great Basin National Park (PL 99-565) stated that "no new expressed or implied reservation to the United States of water or water-related right was created by the Act." Thus, the reserved water rights for Great Basin National Park are limited to those for National Forest purposes and for the former Lehman Caves National Monument. The park holds State appropriative water rights for Cave Spring, which provides water for administrative, visitation, and related management uses. The Water Resources Management Plan needs to provide a general overview of water rights, both Federal reserved and State appropriative, followed by a brief status summary for Great Basin National Park. This information is presently available for the Lehman Creek and Baker Creek drainages (National Park Service, 1988), but not for other drainages within the park.

As there is a need to identify what water rights presently exist (those rights acquired from the U.S. Forest Service and the Bureau of Land Management, and the water rights within the legislative boundary held by other parties) and the amount of water needed to run the park, the Water Resources Management Plan needs to develop a project statement for inventorying parkwide water rights, uses, and needs (with the exception of the Lehman and Baker Creek basins, for which such

an inventory already exists). Further, water rights have not been adjudicated for many of the other drainages within Great Basin National Park. As these adjudications are pending, a second project statement should be developed detailing studies needed in preparation for participation in pending water rights adjudications.

Upon request by the Superintendent, the water rights section and project statements necessary for a Water Resources Management Plan will be prepared by the Water Resources Division (see memo L54(479) WR/GRBA/Water Rights dated June 13, 1989).

2) Surface Water Quality

There is an overall lack of water quality information for the surface waters of Great Basin National Park. Limited water quality information is available for three alpine lakes (Teresa Lake, Stella Lake, Brown Lake) (Metcalf and Stepanian, 1988; Raab et al., 1988), and reconnaissance level water quality monitoring has recently been completed at specific sites in Shingle Creek, Snake Creek, and Lehman Creek (Metcalf and Baker, 1988).

While existing water quality is believed to be good, a number of man-related activities could potentially impact surface water quality within Great Basin National Park. These activities include:

- potential impacts of acidic atmospheric deposition on dilute alpine lakes;
- potential water quality and erosional impacts resulting from cattle and sheep grazing;
- potential contamination from vault toilets in campgrounds and improper sanitation practice at primitive sites;
- potential water quality impacts from abandoned mining operations; and
- potential water quality problems which could result from park operations and maintenance activities including (but not limited to) site development, parking lot runoff, sewage treatment operations, underground storage tanks, etc.

The Water Resources Management Plan needs to summarize and evaluate existing surface water quality information. Because of the general dearth of water quality information within many of the watersheds within Great Basin National Park, it is likely that a thorough inventory of the existing surface water conditions would be desirable. It may be feasible that certain elements of initial inventory efforts be initiated with funds available for water resources planning activities. However, a problem statement should be developed delineating inventory requirements (for both water quality and quantity) and evaluating various alternatives for the design and implementation of long-term water quality/quantity monitoring programs. Such programs would be designed to be responsive to potential water resource problems and meet management objectives. An additional problem statement may be appropriate in order to address the potential impacts of acidic atmospheric deposition on the alpine lakes.

3) Groundwater

The characteristics of groundwater flow in Great Basin National Park, although largely unknown, are believed to be complex and have not been studied in any detail.

Great Basin National Park's primary water supply is groundwater from the Cave Spring system. This system provides water for visitor use at the visitor center, concessions, and picnic area; domestic water supplies at park residences; irrigation for lawn areas and the historic Lehman Orchard; and water for fire suppression, park maintenance, and administration. While flows have generally been adequate, a decline in springflow occurred during a drought in 1972, and water production were not sufficient to meet water demand. Some park operations had to be curtailed because of the reduced water supply.

Groundwater is also believed to play an important role in maintaining the features of Lehman Caves. Lehman Caves are believed to have been formed by seeping water rendered slightly acidic by the activity of soil microorganisms. Today, water in Lehman Caves may be found in pools presumably fed by phreatic groundwater or water seeping into the cave from above. The caves contain living limestone formations, such as stalactites, stalagmites, platelike shields, cave coral, rimstone dykes, curling helictites, flowstone, draperies and aragonite, which are developed from slowly seeping water percolating from the surface. It is not known if present diversions, proposed wells, or surface water contamination presently, or potentially, could affect the groundwater hydrology and the cave system.

Reconnaissance assessments of groundwater resources in the Snake Valley (Hood and Rush, 1965) and the Spring Valley (Rush and Kazmi, 1965) have been completed. However, groundwater information within Great Basin National Park is extremely limited. The Water Resources Management Plan needs to summarize the existing groundwater quantity and quality information, and to develop a project statement evaluating the alternatives for conducting a groundwater study sufficient to assess the sources of potable groundwater available for new park developments (i.e., the proposed visitor center) and for existing park developments during periods of prolonged drought. This study should be designed in a manner that would also provide information on whether present diversions, proposed wells, or surface water contamination could affect either the cave system or groundwater quality.

4) Identification and Protection of Wetlands and Riparian Habitats

While significant wetlands and riparian habitats exist within Great Basin National Park, *they* have not, to date, been systematically surveyed and mapped. Eddleman et al. (1989) report that certain riparian areas within the park have received heavy use from grazing, and that overuse in riparian areas may not only damage an important resource, but can also lead to the degradation of water quality and further impact stream fauna. For example, reestablishment of the native Bonneville cutthroat trout and other cold-water species are dependent upon the presence of cool, clear water, and adequate vegetation to cover the stream. These values may be compromised by erosion related to overgrazing and by the loss of riparian vegetation along the stream banks.

Those responsible for the development of the Water Resources Management Plan need to coordinate activities with the researchers presently developing the Grazing Management Plan in order to review and summarize information presently available relating to the location of wetlands (e.g., wet

meadows) and riparian habitats within the park. They should also cooperate with these researchers in order to devise a strategy to protect wetland and riparian habitats from significant degradation due to grazing activities.

In addition, a project statement should be developed that provides for surveying and mapping of wetlands and riparian habitats at a level appropriate to meet the needs for resource management, and in a manner so that the data would be available for use by the U.S. Fish and Wildlife Service in the National Wetlands Inventory.

The National Park Service is required to manage wetlands in compliance with National Park Service Floodplain Management and Wetland Protection Guidelines and other applicable laws and regulations. The Water Resources Management Plan needs to propose a management strategy consistent with requirements delineated in NPS-77 (National Park Service, in preparation) and Wagner (1989).

5) Floodplain Identification and Management

Major floods occur in most parts of the Great Basin and result from snowmelt, frontal-storm rainfall, and localized convective rainfall. Snowmelt floods typically occur during April - June; floods resulting from frontal rain and frontal rain on snow generally occur during November - March; and floods resulting from convective-type rainfall during localized thunderstorms occur most commonly during the summer months (Burkham, 1988).

Stream channels within the mountainous areas of Great Basin National Park are well defined and of high gradient. Most have moderately sloping banks and relatively narrow floodplains. While, the base (100-year) and critical action (500-year) floodplains have not been delineated for the park, it is likely that several of the existing campgrounds are within the 100-year floodplain.

Mandates and guidance for floodplains within units of the National Park System are found in Executive Order 11988, Floodplain Management (42 FR 26951 May 24, 1977)). This order emphasizes the public safety and environmental aspects of floodplain management and requires that all Federal agencies avoid, to the extent practicable, the adverse impacts associated with the occupancy and modification of floodplains, and also avoid direct and indirect support of floodplain development if there is a practicable alternative. The preferred method for satisfying these requirements is to avoid development on the 100-year floodplain. The 500-year floodplain is also to be avoided for critical actions (e.g., the storage of irreplaceable artifacts, major fuel storage, etc.) undertaken as part of park operations or facilities management.

Floods occur in Great Basin National Park, but usually do not become major problems because of the scarcity of development. Eddleman et al. (1989) reports that two severe flash floods have occurred in this decade in Big Wash, and other flooding throughout the park is likely.

The Water Resources Management Plan needs to summarize available information regarding flooding within the park. If possible, a reconnaissance of all developed visitor-use sites within the park should be undertaken to evaluate those sites most likely to be in flood-prone areas. A problem statement should be included in the Water Resources Management Plan that suggests the additional level of

study (Burkham, 1988) needed to delineate floodplain and evaluate potential flood danger for all developed or heavily used visitor areas within Great Basin National Park.

6) Residual Contamination from Atmospheric Nuclear Weapons Testing

Great Basin National Park is located at the northern edge of areas affected by nuclear weapons testing in the 1950's. A literature review should be conducted to identify and delineate any water contamination that may have resulted in the area from this testing, and to evaluate any special monitoring needs (e.g., water supply radio-nuclides) that may be warranted by this unique situation.

7) Water Resources Issues Related to Existing and Proposed Park Operations and Development

In a number of units of the National Park System, water quality problems result from park operations and maintenance. These are often related to improper site development, inadequate sewage treatment, leaking underground storage tanks, improper use and disposal of hazardous materials, parking lot runoff, wetlands disturbance, etc. The Water Resources Management Plan should address any issues relating to existing or proposed park operations and development which could potentially impact water resources. Issues at Great Basin National Park include, but are not limited to, the development of a water supply for the proposed visitor center; monitoring of the sewage treatment facility for potential groundwater contamination; and the provision of proper water supply and treatment and sewage handling facilities at the campgrounds.

RECOMMENDATION

It is the recommendation of the Water Resources Division that a Water Resources Management Plan be developed for Great Basin National Park.

Water resources are a significant component of the natural resources of the park and existing information is limited. In addition, there are a number of water resource issues facing the park which warrant the development of an integrated management strategy. The development of a Water Resources Management Plan would provide Great Basin National Park with a blueprint for the management of water resources over a 5-10 year period.

Because of staff constraints within both the Water Resources Division and the park, it is recommended that the Water Resources Management Plan be developed under either a cooperative agreement or competitive contract. Monies in the amount of \$22,000 per year for FY90-FY92 have been allocated for this purpose.

The Resource Management staff of Great Basin National Park will manage the project. The Water Resources Division will provide the park with necessary technical and review support. The Water Rights Branch of the Water Resources Division has agreed to author those sections of the Water Resources Management Plan relating to water rights.

The attached appendices provide a proposed outline for the Water Resources Management Plan (Appendix A) and a listing of water-resources related technical references applicable to Great Basin National Park (Appendix B).

Appendix A. Proposed draft outline for Great Basin National Park Water Resources Management Plan.

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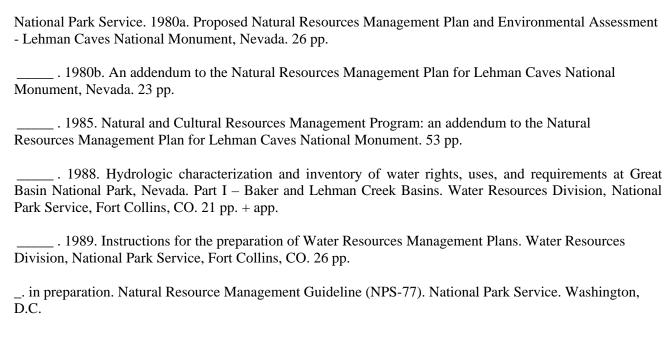
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As the nation's principal conservation agency, the Department of the Interior has responsibility for most of our nationally owned public lands and natural and cultural resources. This includes fostering wise use of our land and water resources, protecting our fish and wildlife, preserving the environmental and cultural values of our national parks and historical places, and providing for the enjoyment of life through outdoor recreation. The department assesses our energy and mineral resources and works to ensure that their development is in the best interest of all our people. The department also promotes the goals of the Take Pride in America campaign by encouraging stewardship and citizen responsibility for the public lands and promoting citizen participation in their care. The department also has a major responsibility for American Indian reservation communities and for the people who live in island territories under U.S. administration.

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